

# PATENT COOPERATION TREATY

## PCT

### INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY


(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

REC'D 23 AUG 2005

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Applicant's or agent's file reference 63261A		<b>FOR FURTHER ACTION</b>		See Form PCT/PEA/416
International application No. PCT/US2004/025906		International filing date (day/month/year) 09.08.2004		Priority date (day/month/year) 29.09.2003
International Patent Classification (IPC) or national classification and IPC C07D301/10				
Applicant UNION CARBIDE CHEMICALS & PLASTICS TECHNOLOGY				
<p>1. This report is the International preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 5 sheets, including this cover sheet.</p> <p>3. This report is also accompanied by ANNEXES, comprising:</p> <p>a. <input type="checkbox"/> sent to the applicant and to the International Bureau) a total of sheets, as follows:</p> <p><input type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).</p> <p><input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the International application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.</p> <p>b. <input type="checkbox"/> (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).</p>				
<p>4. This report contains indications relating to the following items:</p> <p><input checked="" type="checkbox"/> Box No. I Basis of the opinion</p> <p><input type="checkbox"/> Box No. II Priority</p> <p><input type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p><input type="checkbox"/> Box No. IV Lack of unity of invention</p> <p><input checked="" type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p><input type="checkbox"/> Box No. VI Certain documents cited</p> <p><input checked="" type="checkbox"/> Box No. VII Certain defects in the international application</p> <p><input type="checkbox"/> Box No. VIII Certain observations on the international application</p>				
Date of submission of the demand  20.07.2005		Date of completion of this report  19.08.2005		
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465		Authorized Officer  Stroeter, T  Telephone No. +49 89 2399-		



**INTERNATIONAL PRELIMINARY REPORT  
ON PATENTABILITY**

International application No.  
PCT/US2004/025906

**Box No. 1 Basis of the report**

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.
- ☐ This report is based on translations from the original language into the following language , which is the language of a translation furnished for the purposes of:
- ☐ international search (under Rules 12.3 and 23.1(b))
  - ☐ publication of the international application (under Rule 12.4)
  - ☐ international preliminary examination (under Rules 55.2 and/or 55.3)
2. With regard to the **elements\*** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report):*

**Description, Pages**

1-28 as originally filed

**Claims, Numbers**

1-7 as originally filed

- ☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing
3. ☐ The amendments have resulted in the cancellation of:
- ☐ the description, pages
  - ☐ the claims, Nos.
  - ☐ the drawings, sheets/figs
  - ☐ the sequence listing (*specify*):
  - ☐ any table(s) related to sequence listing (*specify*):
4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
- ☐ the description, pages
  - ☐ the claims, Nos.
  - ☐ the drawings, sheets/figs
  - ☐ the sequence listing (*specify*):
  - ☐ any table(s) related to sequence listing (*specify*):

\* If item 4 applies, some or all of these sheets may be marked "superseded."

**INTERNATIONAL PRELIMINARY REPORT  
ON PATENTABILITY**

International application No.  
PCT/US2004/025906

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**Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

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1. Statement

Novelty (N)	Yes: Claims	
	No: Claims	1-7
Inventive step (IS)	Yes: Claims	
	No: Claims	1-7
Industrial applicability (IA)	Yes: Claims	1-7
	No: Claims	

2. Citations and explanations (Rule 70.7):

see separate sheet

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**Box No. VII Certain defects in the international application**

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The following defects in the form or contents of the international application have been noted:

see separate sheet

**Re Item V**

**Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

**1 Prior art documents**

Reference is made to the following documents. The given numbering will be adhered to in the rest of the procedure:

- D1: EP-A-0 480 537 (UNION CARBIDE CHEM PLASTIC) 15 April 1992
- D2: US-A-5 387 751 (HAYDEN PERCY ET AL) 7 February 1995
- D3: US-A-4 994 588 (KAPICAK LOUIS A ET AL) 19 February 1991
- D4: US-B1-6 511 938 (LIU ALBERT CHENG-YU ET AL) 28 January 2003
- D5: EP-A-0 003 642 (ICI PLC) 22 August 1979

**2 Novelty (Article 33(2) PCT) and inventive step (Article 33(3) PCT)**

The present application is directed to a process for the manufacture of ethylene oxide through epoxidation of ethylene in the presence of an silver-containing catalyst comprising an efficiency enhancing salt (e.g. potassium nitrate). The feed comprises ethylene, oxygen and a two-component gas phase promoter, i.e. at least one special chlorine-containing (e.g. ethyl chloride) and at least one special nitrogen-containing component (e.g. nitric oxide).

The processes revealed in D1-D4 are also processes for the manufacture of ethylene oxide in similar reaction conditions and the process features mentioned under A), B) and D) in present claim 1 are known. Even the adjustment of the concentrations of nitric oxide and ethyl chloride in order to optimize catalyst activity and efficiency - related to present item C) - was already disclosed (e.g. D1, example 1, last two lines and others).

The characterizing feature of present independent claim 1 which might provide a novel contribution to the state of the art is the certain adjustment of the amount of each component in the gaseous promoter expressed by the ratio  $N^*/Z^*$ .

In order to confirm novelty for the present claims it is necessary to ensure that all relevant prior art procedures have a ratio  $N^*/Z^* > 1$ . It is the burden of the Applicant to provide all the necessary data, values and calculations in order to prove that the presently claimed process is indeed novel over the relevant prior art such as D1-D4 or the various other documents cited in the present description.

Furthermore, it is unclear how exactly the  $N^*$  and  $Z^*$  values of the present tables were obtained and it is also unclear what happens when the ethane equivalent is zero (consequently  $N^*/Z^*$  should be then also be zero). That would include the consequence that if no or very little ethane (and/or other hydrocarbons effective in removing chloride from the catalysts) is present, the ratio  $N^*/Z^*$  is close to zero and therefore less than 1 fulfilling the requirement of present claim 1, item C). As such, many prior art procedures would then be novelty-destroying per se, i.e. just through the absence of ethane.

Consequently, the subject-matter of the present claims 1-7 does not appear to be novel or inventive.

**4    Industrial applicability (Article 33(4) PCT)**

The subject-matter of the present claims 1-7 is in accordance with the requirements of Article 33(4) PCT.

**Re Item VII**

**Certain defects in the international application**

It is recommended not to use the unit "psig" or "SCFH" etc. as in the present description. These units should be replaced by the appropriate SI unit with respect to Rule 10.1 PCT. The present expression is, however, to be retained in parentheses after the replacement expression.